Amendment No. 4

OHIO DEPARTMENT OF HEALTH

LICENSE FOR RADIOACTIVE MATERIAL

Pursuant to Chapter 3748 of the Ohio Revised Code, and in reliance on statements and representations made by the licensee, a license is hereby issued authorizing the licensee named herein to receive, acquire, possess, and transfer radioactive material as designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the applications of Chapter 3748 of the Ohio Revised Code and all rules promulgated thereunder. This license shall be deemed to contain the conditions specified in Chapters 3701:1-38, 3701:1-40, and 3701:1-50, and Rule 3701-39-02.1 of the Administrative Code, and is subject to all applicable rules, regulations and orders of the Ohio Department of Health now or hereinafter in effect and to any conditions specified below.

LICENSEE	LICENSE NUMBER
1. **Battelle Memorial Institute**	3. **03610250000**
	EXPIRATION DATE
2. **505 King Avenue**	4. **April 1, 2006**
Columbus, OH 43201-2693	BUREAU DOCKET NUMBER
	5. **GC25-06-98**

6. RADIOACTIVE MATERIAL	7. CHEMICAL AND/OR PHYSICAL FORM	8. MAXIMUM QUANTITY THAT LICENSEE MAY POSSESS AT ANY ONE TIME UNDER THIS LICENSE
A. ANY RADIOACTIVE MATERIAL WITH ATOMIC NUMBER 1 TO 83, INCLUSIVE, EXCEPT AS LISTED BELOW	A. ANY	A. 18.5 TBQ (500 CI) TOTAL, NO SINGLE RADIONUCLIDE TO EXCEED 1.3 TBQ (35 CI)
B. CARBON-14	B. ANY	B. 74 GBQ (2 CI)
C. SOURCE MATERIAL AS DEFINED IN OAC 3701:1-38-01(A)	C. ANY	C. 10 KILOGRAMS
D. RADIUM-226	D. ANY	D. 7.41 KBQ (2.0 UCI)
E. RADIUM-228	E. ANY	E. 3.7 KBQ (1.0 UCI)
F. URANIUM-233	F. ANY	F. 2 GRAMS
G. URANIUM-235	G. ANY	G. 100 GRAMS
H. PLUTONIUM-238 AND 239	H. ANY	H. 2 GRAMS
I. PLUTONIUM, EXCEPT PU-238 AND PU -239	I. ANY	I. 10 GRAMS
J. NEPTUNIUM-236, 237, AND 239	J. ANY	J. NO SINGLE RADIONUCLIDE TO EXCEED 1.85 MBQ (50 UCI)
K. AMERICIUM-241, 242M, 243, AND 246	K. ANY	K. NO SINGLE RADIONUCLIDE TO EXCEED 1.85 MBQ (50 UCI)
L. CURIUM-242, 243, 244, AND 246	L. ANY	L. NO SINGLE RADIONUCLIDE TO EXCEED 1.85 MBQ (50 UCI)
M. BERKELIUM-249	M. ANY	M. NO SINGLE RADIONUCLIDE TO EXCEED 1.85 MBQ (50 UCI)
N. CALIFORNIUM-249 AND 252	N. ANY	N. NO SINGLE RADIONUCLIDE TO EXCEED 1.85 MBQ (50 UCI)
O. ANY RADIOACTIVE MATERIAL WITH ATOMIC NUMBER 1 TO 83, INCLUSIVE, EXCEPT AS LISTED BELOW	O. SEALED SOURCES REGISTERED EITHER WITH NRC UNDER 10 CFR 32.210, AN AGREEMENT STATE, OR NARM LICENSING STATE	O. 555 GBQ (15 CI), NO SINGLE SOURCE TO EXCEED 222 GBQ (6 CI)
P. HYDROGEN-3	P. TITANIUM TRITIDE FOIL SOURCES REGISTERED EITHER WITH NRC UNDER 10 CFR 32.210, OR AN AGREEMENT STATE	P. 111 GBQ (3 CI), NO SINGLE SOURCE TO EXCEED 7.4 GBQ (200 MCI)

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6. RADIOACTIVE MATERIAL	7. CHEMICAL AND/OR PHYSICAL FORM	8. MAXIMUM QUANTITY THAT LICENSEE MAY POSSESS AT ANY ONE TIME UNDER THIS LICENSE
Q. HYDROGEN-3	Q. SEALED NEUTRON TUBE GENERATOR (MF PHYSICS)	Q. TWO SOURCES, NO SINGLE SOURCE TO EXCEED 259 GBQ (7 CI)
R. NICKEL-63	R. SEALED SOURCES REGISTERED EITHER WITH NRC UNDER 10 CFR 32.210, OR AN AGREEMENT STATE	R. 22.2 GBQ (600 MCI) , NO SINGLE SOURCE TO EXCEED 1.48 GBQ (40 MCI)
S. CESIUM-137	S. SEALED SOURCES REGISTERED EITHER WITH NRC UNDER 10 CFR 32.210, OR AN AGREEMENT STATE	S. 7.4 GBQ (200 MCI) , NO SINGLE SOURCE TO EXCEED 1.85 GBQ (50 MCI)
T. CESIUM-137	T. SEALED SOURCES REGISTERED EITHER WITH NRC UNDER 10 CFR 32.210, OR AN AGREEMENT STATE	T. 280 GBQ (7.57 CI)
U. RADIUM-226	U. SEALED SOURCE	U. 120 MBQ (3.24 MCI)
V. AMERICIUM-241	V. SEALED SOURCE	V. 190 GBQ (5.14 CI)
W. AMERICIUM-241	W. SEALED SOURCES REGISTERED EITHER WITH NRC UNDER 10 CFR 32.210, AN AGREEMENT STATE, OR NARM LICENSING STATE	W. 14.8 GBQ (400 MCI), NO SINGLE SOURCE TO EXCEED 3.7 GBQ (100 MCI)
X. AMERICIUM-241	X. SEALED SOURCES REGISTERED EITHER WITH NRC UNDER 10 CFR 32.210, AN AGREEMENT STATE, OR NARM LICENSING STATE	X. 18.5 GBQ (500 MCI), NO SINGLE SOURCE TO EXCEED 1.85 GBQ (50 MCI)
Y. AMERICIUM-241	Y. SEALED SOURCE, CPN MODEL NO. 131 OR EQUIVALENT	Y. 1.85 GBQ (50 MCI) IN A SINGLE SOURCE

9. Authorized Use

A. to O. **Research and development as defined in Rule 3701:1-38-01 of the Administrative Code.**

P., R., X. **To be used in a gas chromatograph and/or aerosol/airborne contaminant gas and vapor detector as specified in application dated March 31, 2000.**

Q. **To be used as tritium targets in research and development as defined in Rule 3701:1-38-01 of the Administrative Code.**

S., W., Y. **To be used for measuring physical properties of materials, in gauging devices that have been registered either with NRC under 10 CFR 32.210, or with an Agreement State or NARM Licensing State, and have been distributed in accordance with a specific license authorizing distribution to persons specifically authorized by an NRC, Agreement State, or NARM Licensing State license to receive, possess, and use the devices.**

T. **For use in a J.L. Shepherd Model 51 Calibrator, for calibration and test of radiation survey instrumentation.**

U., V. **For storage only awaiting disposal, such disposal to be accomplished by December 31, 2002, unless otherwise authorized in writing by the Director.**

CONDITIONS

10. Licensed material may only be used at the licensee's facilities located at:

A. **505 King Avenue, Columbus, Ohio**

B. **1425 Plain City-Georgesville Road / State Route 142, West Jefferson, Ohio (materials other than those licensed by NRC pursuant to a license for special nuclear material constituting a formula quantity of material per NRC license SNM-7).**

C. **Temporary job locations anywhere in the state of Ohio (uses in items 9.P, R., S., W., X., and Y. only)**

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11. The Radiation Safety Officer (RSO) for this license is **Craig Jensen**

    A. ***Assistant RSO is Leonard Davis.***

12. Licensed material shall be used by, or under the supervision of, individuals approved by the Radiation Safety Committee (RSC), **Ronald Moutvic, DVM, Chair**:

    A. **The RSC shall maintain records of individuals designated as users.**

    B. **All individuals working with or in the vicinity of licensed materials shall have received the training specified in application dated March 31, 2000.**

    C. **Use of licensed material at temporary job locations shall be by, or under the supervision of and in the physical presence of, individuals who have received the training specified in application dated March 31, 2000.**

13. **All sealed sources that are used or obtained shall have been evaluated and approved by the U.S. Nuclear Regulatory Commission under the provisions of 10 CFR 32.210 as delineated in Rule 3701-39-02.1 of the Administrative Code, or an equivalent Agreement State or NARM Licensing State regulation, except as otherwise specified below.**

14. A. **Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed six (6) months, or at such other intervals as specified by the certificate of registration referred to in 10 CFR 32.210.**

    B. **Notwithstanding paragraph A of this Condition, sealed sources designed to emit alpha particles shall be leak tested for leakage and/or contamination at intervals not to exceed three (3) months.**

    C. **In the absence of a certificate from a transferor indicating that a leak test has been made within six months prior to the transfer, a sealed source or detector cell received from another person shall not be put into service until tested.**

    D. **Sealed sources need not be tested if:**

        1) **they contain only hydrogen-3; or**

        2) **they contain only a radioactive gas; or**

        3) **the half-life of the isotope is 30 days or less; or**

        4) **they contain 3.7 MBq (100 μCi) or less of beta- or gamma-emitting, or 370 kBq (10 μCi) or less of alpha-emitting material; or**

        5) **they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transfer to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source shall be stored for a period of more than ten years without being tested for leakage and/or contamination.**

    E. **The leak test shall be capable of detecting the presence of 185 Bq (0.005 μCi) of radioactive material on the test sample. If the test reveals the presence of 185 Bq (0.005 μCi) or more of removable contamination, a report shall be filed with the Ohio Department of Health, and the source shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Ohio Department of Health regulations. The report shall be filed within five (5) days of the date the leak test result is known, with the Ohio Department of Health, 246 N. High St., Bureau of Radiation Protection/7th Floor, 35 Bldg., Columbus, Ohio 43216-0118. The report shall specify the source involved, the test results, and corrective action taken. Leak test results shall be kept in SI or standard units, and shall be maintained for inspection by the Director. Individual leak test records may be disposed of after inspection by the Director.**

    F. **The licensee is authorized to collect leak test samples and perform analyses. Alternatively, leak tests may be performed by persons specifically licensed by the Director, the NRC, or an Agreement state to perform such services.**

    G. **Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, or contamination, prior to any use or transfer to others as a sealed source.**

15. **Detector cells containing a titanium tritide foil:**

    A. **shall only be used in conjunction with a properly operating temperature control mechanism which prevents the foil temperature from exceeding that specified by the manufacturer, and approved by the Director; and**

    B. **shall be vented to the outside when in use.**

16. **The licensee shall not open sealed sources containing licensed material, nor remove sources from the source holder.**

17. **Experimental animals, or the products from experimental animals, that have been administered licensed materials shall not be used for human consumption.**

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18. **The licensee shall not use licensed material in field applications where activity is released except as provided otherwise by specific condition of this license.**

19. **The Radiation Safety Officer shall conduct program audits and confirmatory radiation surveys of each location where radioactive material will be utilized in accordance with the frequencies outlined in the application dated March 31, 2000.**

    A. **Notwithstanding the above, all radiation safety program elements and locations of use shall be audited by the RSO or RSO's designee at least annually.**

20. **The licensee shall conduct a physical inventory every twelve (12) months to account for all sealed sources and/or devices received and possessed under this license. Records of inventories shall be maintained for inspection by the Director.**

21. **The licensee is authorized to transport licensed material only in accordance with the provisions of Chapter 3701:1-50 of the Administrative Code.**

    A. **Such transport may include uses at temporary job sites that involve use in aircraft under the exclusive control of the licensee.**

    B. **Sealed source devices used at temporary job sites shall have a lock or outer locked container designed to prevent unauthorized or accidental removal of the source from its shielded position. The device or its container shall be locked when in transport, storage, or when not under the direct surveillance of an authorized user.**

    C. **While performing tests at temporary job sites, portable gauges and devices shall not be left unattended. Upon completion of tests the device shall be locked in the licensee's vehicle or a secure location to prevent unauthorized use, loss, or theft.**

22. **The licensee is authorized to hold radioactive material with a physical half-life of 90 days or less for decay-in-storage before disposal in ordinary trash provided:**

    A. **Radioactive waste to be disposed of in this manner shall be held for decay a minimum of 10 half-lives.**

    B. **Before disposal as normal waste, waste decayed in storage shall be surveyed at the container surface with the appropriate survey meter set on its most sensitive scale, and with no interposed shielding, to determine that its radioactivity cannot be distinguished from background. All radiation labels shall be removed or obliterated.**

    C. **A record of each disposal permitted under this license condition shall be retained for three (3) years. The record must include the date of disposal, the date on which the radioactive material was placed in storage, the radionuclides disposed of, the survey instrument used, the background dose rate, the dose rate measured at the surface of each waste container, and the name of the individual who performed the disposal.**

23. **Any decommissioning activities shall be conducted only in accordance with the licensee's Decommissioning Plan, as submitted to and approved by the U.S. Nuclear Regulatory Commission.**

    A. **Notwithstanding the release criteria stated in the submitted decommissioning plan, the licensee shall follow the "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated April 1993.**

    B. **Portions of the facility may be released for unrestricted use, only after the licensee submits a report that includes the following:**

        1) **Identification of the facilities where radioactive materials were used and stored, or disposed of on site**

        2) **Brief description of operations conducted and radioactive materials used in the facilities**

        3) **Assessment of the results of the decontamination activities.**

        4) **Basis for unrestricted release, including sampling and survey methods and instrumentation used, and including final contamination survey data for the facilities and grounds**

        5) **Demonstration that ongoing activities in areas outside the area for which release is proposed will not lead to reintroduction of radioactive materials.**

    C. **Notwithstanding the above, the licensee shall not release any area or portion of a facility for unrestricted use until approved in writing by the Director.**

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24. ***Notwithstanding other contamination control requirements, the licensee shall limit removable surface contamination from hydrogen-3 to less than 10,000 disintegrations per minute averaged over each 100 square centimeters.***

25. **Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Ohio Department of Health's statutes, rules, and orders shall govern unless statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.**

A. **Application dated March 31, 2000;**

B. **Letter correspondence (two) dated April 21 and May 23, 2000;**

C. **Facsimile letter correspondence (two) transmitted June 9, 2000 and July 12, 2000;**

D. **Email correspondence (three), C. Jensen of BMI to G. Cicotte of ODH, transmitted June 13, 2000 (two), and June 22, 2000;**

E. **Correspondence as delineated in former NRC license SNM-7 (timely renewal);**

F. **Letter correspondence dated August 7, 2001;**

G. **Letter correspondence dated March 15, 2002;**

H. ***Letter correspondence dated May 7, 2002.***

For the Ohio Department of Health

DATE: 6/11/02

BY: Richard L. Suppes for
Director, Ohio Department of Health